Claims

1. A method for controlling a magnetoresistive solid-state storage device having a plurality of storage cells for storing a block of ECC encoded data, the method comprising the steps of:

accessing a set of the plurality of storage cells; and

determining whether information is unrecoverable from a block of ECC encoded data stored in the accessed storage cells.

2. The method of claim 1, comprising determining whether information is unrecoverable, by attempting to perform ECC decoding of the block of ECC encoded data.

3. The method of claim 2, comprising continuing use of the set of storage cells, if the ECC decoding recovers information from the block of ECC encoded data.

4. The method of claim 2, comprising taking remedial action concerning the set of storage cells, if the ECC decoding does not recover information from the block of ECC encoded data.

5. The method of claim 2, comprising identifying, from the ECC decoding, zero or more failed symbols in the block of ECC encoded data; and comparing the identified number of failed symbols against a threshold value.

6. The method of claim 1, comprising determining whether original information is expected to be

unrecoverable from a block of ECC encoded data stored in the accessed set of storage cells.

7. The method of claim 6, wherein original information is expected to be unrecoverable because a probability of failing to correctly perform ECC decoding of the block of ECC encoded data is unacceptably high.

8. The method of claim 6, comprising continuing use of the set of storage cells, when original information is not expected to be unrecoverable from the block of ECC encoded data stored in the accessed storage cells.

9. The method of claim 8, comprising taking remedial action concerning the set of storage cells, when original information is expected to be unrecoverable from a block of ECC encoded data stored in the accessed storage cells.

10. The method of claim 6, comprising determining, from accessing the set of storage cells, failed symbols in the block of ECC encoded data that have been affected by a physical failure.

11. The method of claim 10, comprising determining that there are more failed symbols in the block of ECC encoded data than can be corrected by error correction decoding the block of ECC encoded data.

12. The method of claim 10, comprising determining that due to failed symbols in the block of ECC encoded data, there is an unacceptable probability that decoding the block of ECC encoded data will not correctly recover original information.

13. The method of claim 6, comprising obtaining a parametric value for each of the set of storage cells, and comparing each parametric value against a range or ranges.

14. The method of claim 13, comprising deriving a logical bit value for each storage cell, as a result of comparing each parametric value against a range or ranges.

15. The method of claim 13, comprising identifying a cell or cells, amongst the set of storage cells, as being affected by a physical failure.

16. The method of claim 15, wherein the determining step comprises comparing a failure count based on the identified cells against a threshold value.

17. The method of claim 16, wherein the threshold value represents a number of failed symbols equal to or less than a total number of failed symbols which can be corrected by error correction decoding the block of ECC encoded data.

18. The method of claim 15, comprising using the identified cells to determine failed symbols, and comparing a count of the failed symbols against the threshold value.

19. The method of claim 18, wherein the threshold value is set to be in the range of about 50% to about 95% of the maximum number of failed symbols which can be corrected by error correction decoding the block of ECC encoded data.

20. The method of claim 6, comprising selectively ECC decoding the block of ECC encoded data in response to the determining step.

21. The method of claim 1, wherein the block of encoded data corresponds to a sector of original information.

22. The method of claim 1, wherein the block of ECC encoded data is a codeword, and wherein a plurality of codewords are grouped to form an encoded sector corresponding to a sector of original information.

23. The method of claim 1, performed prior to use of the storage device.

24. The method of claim 1, performed during use of the storage device.

25. A method for controlling a magnetoresistive solid-state storage device, comprising the steps of:

receiving original information which it is desired to store;

error correction encoding the original information to form a block of ECC encoded data;

storing the block of ECC encoded data in a set of magnetoresistive storage cells arranged in at least one array;

accessing the set of storage cells;

forming logical symbol values of the block of ECC encoded data from the accessed set of storage cells;

error correction decoding the block of ECC encoded data to provide recovered information;

if the decoding step provides recovered information then outputting the recovered information and continuing use of the set of storage cells, or else if the decoding step did not provide recovered information then taking remedial action in respect of the set of storage cells.

26. The method of claim 25, comprising:

identifying, from the ECC decoding, zero or more failed symbols in the block of ECC encoded data;

comparing the identified number of failed symbols against a threshold value; and

if the ECC decoding did not recover original information, or if the identified number of failed symbols is greater than the threshold value, then taking remedial action concerning the accessed set of storage cells.

27. A method for controlling a magnetoresistive solid-state storage device, comprising the steps of:

receiving original information which it is desired to store;

error correction encoding the original information to form a block of ECC encoded data;

storing the block of ECC encoded data in a set of magnetoresistive storage cells arranged in at least one array;

accessing the set of storage cells;

comparing parametric values obtained by accessing the set of storage cells against one or more ranges;

identifying failed cells amongst the accessed set of cells;

forming a failure count based on the identified failed cells;

comparing the failure count against a threshold value; and

determining whether the original information is expected to be unrecoverable from the block of ECC encoded data stored in the accessed set of storage cells.

28. The method of claim 27, comprising selectively attempting error correction decoding of the block of ECC encoded data, when original information is not expected to be unrecoverable, or else taking remedial action for the accessed set of storage cells where original information is expected to be unrecoverable.

29. The method of claim 28, wherein comparing the failure count against the threshold value indicates a probability of failing to correctly perform ECC decoding on the block of ECC encoded data as acceptable or unacceptable.

30. The method of claim 27, wherein the failure count is based on a number of failed symbols in the block of ECC encoded data, the failed symbols being identified with reference to the failed cells.

31. The method of claim 27, wherein the threshold value represents about 50% to about 95% of the maximum number of failed symbols which can be corrected by error correction decoding the block of ECC encoded data.

32. A magnetoresistive solid-state storage device, comprising:

at least one array of magnetoresistive storage cells;

a ECC encoding unit for forming a block of ECC encoded data from a unit of original information; and

a controller arranged to store the block of ECC encoded data in a set of the storage cells, access the set of storage cells, and determine whether the original information is unrecoverable from the block of ECC encoded data stored in the accessed set of storage cells.

33. An apparatus comprising the magnetoresistive solid-state storage device of claim 32.